WHAT IS CLAIMED IS:

1. A method for assigning a predetermined wavelength between two different nodes in a wavelength division multiplexing ring communication network that has an N number of nodes and at least one pair of optical fibers sequentially connecting the N number of nodes, the method comprising the steps of:

forming a matrix that represents optical-path configuration and wavelength assignment for an N-1 number of nodes;

extending the matrix by adding a column at any position of the matrix and then assigning X to locations of the added column;

adding an N/2 number of rows in the matrix;

tracking along each row toward the left, from the added column, to find a first encountered numeral and increasing the found numeral by one;

assigning numerals 1, 2, ..., N/2 sequentially to locations corresponding to the added column in the added rows, and assigning X to locations next to the numeral-assigned locations, the number of X-assigned locations being equal to a hop-number corresponding to the assigned numeral minus 1; and

tracking along each of the added rows toward the right to find an empty location and assign thereto a numeral not used, among the numerals 1, 2, ..., N/2, in the same column as the empty location and assigning X to locations next to the empty location, the number of X-assigned locations being equal to a hop-number corresponding to the assigned

numeral minus 1,

where N being an even number, and X representing that an optical path of the corresponding node is not formed.

2. The method as set forth in claim 1, wherein the step of forming the matrix comprises the steps of:

preparing the matrix having rows and columns, a number of rows being equal to a number of nodes (N-1), a number of columns being equal to a lower limit value W of the number of wavelengths required when the number of nodes is N-1;

assigning a set of numerals {1, 2, ..., Lmax} sequentially to locations of a first column of the matrix, while assigning X to a location where no numeral is assigned, and assigning X to locations next to a numeral-assigned locations along each row, the number of X-assigned locations being equal to a hop-number corresponding to the assigned numeral minus 1; and

shifting one by one toward the right in the matrix to assign a rotated set of numerals sequentially to each column, the rotated set of numerals being obtained by rotating a set of numerals used in the previous column, and assigning X to the remaining locations.

3. The method as set forth in claim 2, wherein when the number of nodes is N-1, a lower limit value W is given by:

$W = \{(N-1)^2 - 1\}/8.$

4. A method for assigning a predetermined wavelength between two different nodes, in case where a number of nodes is increased, in a wavelength division multiplexing ring communication network that has an N number of nodes and at least one pair of optical fibers sequentially connecting the N number of nodes, the method comprising the steps of:

expressing, by a matrix, optical-path configuration and wavelength assignment of the network before extending the number of nodes;

extending the matrix by adding a column to extend the number of nodes at a corresponding position of the matrix and then assigning X to the added column;

tracking along each row toward the left, from the added column, to find a first encountered numeral and increasing the found numeral by one, and, if the numeral exceeds a maximum number of hops (Lmax = (N-1)/2)) after being increased, modifying the numeral to a hop-number from a column corresponding to the first-encountered numeral to the added column;

tracking along each row toward the right, from the added column, to find a firstly encountered numeral and assigning, to each row of the added column, a hop-number from the added column to a column corresponding to the firstly-encountered numeral; and

assigning X to an empty location of the added column,

where N being an odd number, and X representing that an optical path of the corresponding node is not formed.